HEALTH CARE NEEDS AND IMMUNIZATION STATUS AMONG MEDICAID CHILDREN WITH EPSDT SCREENING VISITS, 1989 AND 1992

Special Report
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I. INTRODUCTION

The Early Periodic Screening, Diagnosis and Treatment (EPSDT) Program was established in 1967 as the pediatric component of the Medicaid program. The goal of EPSDT is to periodically screen Medicaid-enrolled children for correctable health problems throughout their development (up to 21 years of age) and, in turn, to provide appropriate treatment for any identified problems. The purpose of this report is to describe what happens during an EPSDT screening visit and how that content has changed over time. Specifically, we examine data on the health care needs and immunization status of Medicaid children who participated in EPSDT in four states in 1989 and 1992.

We begin with a description of the special screening files used in our analysis and a presentation of preliminary results. These results are followed by a more detailed analysis of the health care needs in Georgia and Michigan, and a comparison to the prevalence of health care needs found in these screening files with those observed in a national sample of preventive care visits made by Medicaid children and other children not covered under Medicaid. We also investigated the extent to which the health care needs of Medicaid children in Georgia and Michigan are met by providers during the EPSDT screening visits and the extent to which children are referred to other providers for further diagnosis and treatment. Finally, we describe findings regarding EPSDT participants' up-to-date status for common childhood immunizations.

II. SUPPLEMENTAL EPSDT HEALTH SCREENING FILES

As part of the HCFA contract *Medicaid Analysis Project for States* (known as the MAPS or Tape-to-Tape project), we developed research files from the 1989 and 1992 EPSDT Supplemental Health Screening Files in four States--California, Georgia, Michigan and Tennessee. This paper presents an analysis of the contents of these files as part of another multi-year HCFA Contract--*Comparative Study of the Use of EPSDT and Other Preventive and Curative Health Care Services by Children Enrolled in Medicaid*[1]--awarded to The MEDSTAT Group.

The Tape-to-Tape database includes all enrollment, claims and provider data from Medicaid Management Information Systems (MMIS) and other supplemental files in four States--California, Georgia, Michigan and Tennessee--for calendar years 1980 through 1992. The MEDSTAT Group created uniform

[1]See Herz, E., Sredl, K., and Albers, LA: *Trends in the Use of EPSDT and Other Health Care Services by Children Under Medicaid, 1989 and 1992* (March 14, 1996) for more detailed background information and additional descriptive analyses performed under this contract.

research files from these raw State input files. In this process, file formats across States were made identical, and MEDSTAT mapped most of the data from raw State codes into uniform (or consistent) codes. In addition, facility bills for hospital stays were combined into unique stay records, adjustment records were combined with original claims to show the final adjudicated reimbursement for services, and dates, quantities and code values were screened for reasonableness.

There are two different sets of Tape-to-Tape files that incorporate EPSDT screening services. The first of these is the uniform all other/outpatient claims file where each record represents an individual service. This file includes all ambulatory services (excluding drugs and visits by phyicians/other practitioners to inpatients; see Footnote 1 for more information). The second data set contains State EPSDT files, which have additional information beyond that which "fits" on the uniform Tape-to-Tape all other/outpatient claims file. One task on MEDSTAT's recently completed Tape-to-Tape contract was the creation of supplemental EPSDT health screening files that capture as much of this additional information as possible (given variations across the State systems, quality of the data, and research interest in the data). Data elements incorporated into these supplemental files include: (1) type of screen (e.g., complete or partial), (2) immunization status (e.g., up-to-date for age or not), (3) problems/conditions identified during the screening (described in more detail below), (4) measurement data (e.g., height, weight, blood pressure), and (5) tests given as part of an EPSDT screening visit.

For each State-specific source file, the presence of any health care needs discovered during the course of a screen was documented. Generally, these needs were categorized by major body system. Although the delineation of body systems or problem areas was not uniform across State source files, there was sufficient information to establish the following 22 potential problem areas in the uniform screening files: behavior/social development/mental health, physical growth, chest/lung, heart/circulatory, blood, abdomen/digestive, urine/genitourinary, reproduction, skin/subcutaneous, musculoskeletal, oral health, nutrition, eye, ear, nose/sinus, throat, nervous system, congenital anomalies, environmental hazards, endocrine and metabolic disorders, genetic and chromosomal disorders, and other nonspecific problems.

For each problem area, we recoded each State's data on health care needs into a uniform set of problem indicator codes -- (1) no problem and not referred, (2) problem under care or treated, (3) problem referred, and (4) problem referred and treated.

Due to variation in the items collected by each State's system and variation in the quality of the data, there are some limitations in using the supplemental EPSDT health screening files for analysis. To meet the needs of this project, MEDSTAT has created uniform files for California, Georgia, Michigan and Tennessee.

Uniform files are available for 1989 and 1992 for all States except Tennessee, for which only 1989 data are in a uniform format. Michigan provided problem data for 1989 only and although some immunization data were available, these data were unusable for our purposes. California's problem data were not comparable to that collected in the other States but its immunization information was useable. Georgia did not obtain data on immunizations but problem data were available for both analytic years. Finally for Tennessee, only the 1989 immunization data were comparable. For all States except Michigan (1992 data only) we could identify whether there was a referral for services.

III. IDENTIFICATION, TREATMENT AND REFERRAL OF HEALTH CARE NEEDS THROUGH THE EPSDT PROGRAM

We begin with an overview of problems identified for all four study States during 1989. Further detailed analyses of problem identification are provided for Georgia (1989 and 1992) and Michigan (1989). The screening data on the prevalence of health care needs are also compared to national survey data for Medicaid and non-Medicaid children. Finally, we also investigate the extent to which health care problems are addressed during EPSDT screening visits versus referred to other providers for further diagnosis and treatment.

A. Summary of Findings on Problem Identification and Treatment and Referral Patterns

Limitations on data comparability across the four Tape-to-Tape States prevent overall conclusions. However, with respect to Georgia (1989 and 1992) and Michigan (1989), problem identification as well as treatment and referral patterns during EPSDT screening visits indicate the following:

- EPSDT is doing what it was designed to do--EPSDT providers identified health care needs for more than half of the children screened, treated the majority of these problems during the screening visits, and referred children to other health care providers for further diagnosis and treatment when they could not manage the problem.
- Nearly all children aged three years and older were either treated during screens or referred to other providers for dental care. Nutrition-related problems were also common among Georgia Medicaid children (not separately identifiable in Michigan).
- Providers in Michigan made referrals about twice as often as providers in Georgia during 1989. These differences were likely due to resources available among the EPSDT providers and other community providers, as well as to State-specific Medicaid program characteristics.

Analyses of 1991 national survey data also yielded the following results:

- Compared to EPSDT screening data, problem identification was far less frequent in national survey data for both Medicaid and non-Medicaid children who had preventive care office visits in 1991.
- National survey data also showed that physicians were less likely to identify health problems for their Medicaid patients than for their non-Medicaid patients.

B. Problem Identification

In Table 1, the proportions of full EPSDT screening visits[2] with identified health care needs are presented for all four study States for 1989. (Similar data for 1992 were not available for all States.) Health care needs include treatment, referral, or both. Referrals could have been made for identified or suspected problems, as well as for needed preventive care such as dental examinations. The data in this table have not been age or sex adjusted. Furthermore, some children may have had multiple screens, resulting in problems being counted more than once.

With those caveats in mind, the findings for Georgia and Michigan were very different from the results for California and Tennessee in 1989. Overall, the data indicate that 52 and 60 percent of the EPSDT screening visits in Georgia and Michigan, respectively, had at least one health care need treated and/or referred. In contrast, the treatment and/or referral rates for California and Tennessee were much lower at 25 and 14 percent, respectively. Oral health care needs account for much of the difference. Fifty percent of the Georgia screening visits and 63 percent of the Michigan screening visits included treatment and/or referral for dental care. The comparable numbers in California and Tennessee were 2 percent and 13 percent, respectively. The extremely low referral rate for dental services in California may be partly explained by the severe shortage of dental providers participating in the Medicaid program in 1989.[3]

Furthermore, Georgia and Michigan had the highest treatment and/or referral rates for all problem areas. Tennessee's low rate is understandable because the data source only identified health care needs for which a referral was appropriate; visits that involved treatments alone may have been omitted. For

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[2] Partial screening visits for eye examinations found in the Georgia file are not included in this table. Subsequent tables that show the prevalence of problems among children do use information from these visits.

[3] See *Chapter 1: California* in Ian Hill and Beth Zimmerman, *Evaluation of EPSDT Programs in the Tape-to-Tape States. Volume II: Case Study Reports.* Final report submitted to the Office of Research and Demonstrations, Health Care Financing Administration, Baltimore, MD, January 6, 1995.

TABLE 1

PROPORTION OF EPSDT SCREENING VISITS* WITH HEALTH CARE NEEDS TREATED AND/OR REFERRED BY PROBLEM TYPE
California, Georgia, Michigan and Tennessee, 1989

Problem Type	California	Georgia	Michigan	Tennessee
No. of EPSDT screening visits	754,590	106,534	111,762	104,248
Behavior/mental health	<1%	2%	1%	<1%
Physical growth	1	6	3	1
Chest/lung	<1	8	7	1
Heart/circulatory	3	3	1	1
Blood	3	5	11	<1
Abdomen/digestive	--	1	3	1
Urine	<1	3	7	1
Reproductive	<1	1	1	11
Skin/subcutaneous	--	9	1	2
Musculoskeletal	--	0	1	1
Teeth	2	50	63	13
Nutrition	2	24	--	<1
Eye	1	3	--	4
Ear	<1	6	13	4
Nose/sinus	--	1	1	<1
Throat	--	3	--	1
Nervous system	--	0	--	<1
Congenital anomalies	--	0	--	<1
Environment	<1	0	--	<1
Endocrine/metabolic	--	<1	--	<1
Genetic	<1	<1	<1	<1
Other non-specific	21	--	22	--
Overall physical	25	52	60	14

*Partial screening visits for eye examinations in Georgia are not included in these figures.

California, there were many problem areas with a code indicating that the screening procedure was refused, not indicated or not needed. Also, California had a high rate (21 percent) of health care needs that did not fit into our problem list. Because California and Tennessee data are incomplete, they are not included in the following more detailed discussions of EPSDT problem identification, treatments and referrals.

1. Variations in problem identification rates by subgroups

In Table 2, we report the percentage of children in Georgia (1989 and 1992) and Michigan (1989) for whom providers identified health care needs during an EPSDT visit by age group, gender and race. By using children rather than screening visits as the unit of analysis, we avoid the potential for double counting. In addition, to make the data more comparable across the two States, we separate out oral health care needs from physical and mental health care needs. (The latter category is subsequently referred to simply as "physical health care needs" even though it includes behavior/social development/mental health care problems.)

Generally, the data show that more than half of all Medicaid children screened in Georgia and Michigan during 1989 had at least one health care need identified. Children in Michigan were somewhat more likely to have a physical health care need identified during an EPSDT screening visit than were children in Georgia (60 versus 54 percent). This pattern was also observed across all subgroups with the exception of children ages one to two years. Across the age groups studied, there was little variation in the rate of physicial health care needs in Michigan, except for adolescents for whom the prevalence of potential health problems was substantially higher than for younger children. In contrast, the rate of physical health care needs declined slightly with increasing age in Georgia. As a result, the greatest difference between the two States in the physical health care need identification rate is in the 13 to 20 year old age group: in Georgia, 49 percent were found to have physical health care needs, while in Michigan, 72 percent had identified physical health care needs. In both States during 1989, nearly all children aged three years and older (94 to 96 percent) were either treated or referred for dental care.

In both States, there was no substantial difference between genders in the identification of physical health care needs. However, EPSDT providers in Michigan and Georgia during 1989 were more likely to find oral health care needs among males than among females.

We also found differences in the rate of health care need identification between African American and white children in both States during 1989. In Georgia, white children were more likely to have physical health care needs identified, and in Michigan, African American children were more likely to have oral health

TABLE 2

PERCENTAGE OF CHILDREN WITH HEALTH CARE NEEDS
IDENTIFIED DURING EPSDT SCREENING VISITS BY AGE GROUP, GENDER AND RACE:
MICHIGAN, 1989 AND GEORGIA, 1989 and 1992

	Michigan - 1989		Georgia - 1989		Georgia - 1992	
	Physical Health	Oral Health	Physical Health	Oral Health	Physical Health	Oral Health
All children with visits	60.3%	64.4%	54.0%	59.6%	53.7%	49.5%
Age Group						
Under 1 year	58.6	1.5	56.2	1.4	57.2	1.3
1-2 years	57.4	9.0	64.3	11.9	63.0	11.1
3-6 years	58.3	93.9	50.3	95.2	47.5	100.0
7-12 years	57.4	96.1	49.7	94.3	45.2	100.0
13-20 years	72.4	95.1	48.9	94.4	44.6	100.0
Gender						
Male	59.6	62.7	54.5	57.9	54.6	48.3
Female	60.9	66.0	53.6	61.2	52.8	50.8
Race						
White	61.1	60.6	57.5	60.2	56.0	45.1
African American	59.2	68.9	52.9	59.4	52.2	52.6
Other	58.4	69.8	42.8	55.1	55.6	30.6
Unknown	65.8	69.8	63.1	82.7	67.8	47.7

care needs identified. The other race category, which includes Hispanics and Asians, had the lowest rate of both physical and oral health care needs in Georgia and the lowest rate of physical health care needs but the highest rate of oral health care needs in Michigan. Children of unknown race, who accounted for less than one percent of EPSDT participants in both States, had the highest rate of both physical and oral health care needs.

Changes in problem identification rates over time for Georgia are also shown in Table 2. The prevalence of physical health care needs among Georgia Medicaid children with EPSDT screening visits remained constant from 1989 and 1992. This was true for children in all age, gender and race categories, except for the "other" race category (which showed a higher percentage of such children with physical health care needs in 1992 than in 1989). At first glance, a smaller percentage of children appear to have been treated or referred for dental care in 1992. However, the lower rate is totally due to the change in the age distribution (see Table D-4 in the report referenced in footnote 1). Children under three years of age are not typically treated or referred for dental care. All Georgia Medicaid children ages three years and over who participated in EPSDT were either treated or referred for dental care in 1992, up slightly from the 1989 levels.

In Tables 3, 4, and 5, we further disaggregate, by problem type and age group, the physical health care need rates of children with EPSDT screening visits in Georgia (1989 and 1992) and Michigan (1989), respectively. In Georgia during 1989, nutritional problems were by far the most frequently identified health care need -- roughly 26 percent of all children were treated or referred for a potential problem related to nutrition. Generally, in both 1989 and 1992, for Georgia Medicaid children who participated in EPSDT, the conditions identified for each age group seemed age-appropriate. The identification of problems related to physical growth decreased with age, problems related to behavior, the reproductive system and the eye increased with age, and problems related to the ear were concentrated in the one to two year old age group. There was little variation in top conditions among the different age groups in Michigan. As in Georgia, the rate at which problems were related to the eye increased with age, and the diagnosis of ear problems was highest among one to two year olds. Other findings were less intuitive; for example, reproductive problems generally did not increase with age and physical growth problems did not decrease with age.

Between the two States during 1989, there are few similarities in the types of health care needs identified most frequently. Nutrition problems, the most frequently noted need in Georgia, were not separately identified in Michigan; these problems were included in the "other" category. Thus, while the

TABLE 3

PERCENTAGE OF CHILDREN WITH HEALTH CARE NEEDS
IDENTIFIED DURING EPSDT SCREENING VISITS BY PROBLEM TYPE AND AGE GROUP
Georgia, 1989

	Under 1 Year	1-2 Years	3-6 Years	7-12 Years	13-20 Years	All Ages*
No. of children with EPSDT visits	17,389	18,701	22,997	18,423	12,916	90,432
Behavior/mental health	0.1%	0.6%	2.1%	3.1%	3.3%	1.8%
Physical growth	10.3	9.2	4.5	3.3	0.7	5.1
Chest/lung	12.8	12.5	5.0	3.0	0.7	7.2
Heart/circulatory	2.6	2.8	4.4	3.7	3.1	3.1
Blood	3.3	7.2	5.1	7.0	5.1	5.8
Abdomen/digestive	4.2	1.8	0.7	0.0	0.7	1.6
Urine	3.3	2.8	3.7	3.7	3.7	3.6
Reproductive	0.4	0.5	0.3	0.5	4.8	0.0
Skin/subcutaneous	17.1	11.5	5.1	6.2	6.8	9.0
Musculoskeletal	0.3	2.0	5.0	0.0	0.7	0.0
Eye	2.6	2.8	3.1	5.3	5.8	3.8
Ear	9.2	16.3	7.9	5.3	4.6	9.1
Nose/sinus	2.3	2.4	1.3	0.9	0.5	1.5
Throat	2.3	3.8	3.4	2.8	2.0	3.0
Nutrition	22.7	33.4	24.2	22.9	24.2	25.5
Other**	0.5	0.8	0.6	0.8	1.2	0.8
Overall physical	56.2	64.3	50.3	50.0	48.9	54.0

*Six children with unknown ages are included in this column.
**Includes endocrine and genetic problems.

TABLE 4

PERCENTAGE OF CHILDREN WITH HEALTH CARE NEEDS
IDENTIFIED DURING EPSDT SCREENING VISITS BY PROBLEM TYPE AND AGE GROUP
Georgia, 1992

	Under 1 Year	1-2 Years	3-6 Years	7-12 Years	13-20 Years	All Ages*
No. of children with EPSDT visits	44,956	40,812	39,887	21,021	13,102	159,778
Behavior/mental health	0.1%	0.6%	1.9%	3.4%	2.8%	1.3%
Physical growth	9.0	10.6	0.4	3.3	2.9	7.3
Chest/lung	13.6	16.2	5.9	4.1	2.1	10.2
Heart/circulatory	2.0	0.0	3.0	2.8	2.9	2.4
Blood	2.8	7.1	5.9	5.9	4.0	5.0
Abdomen/digestive	5.8	0.0	3.9	0.8	0.8	2.9
Urine	3.1	0.8	3.0	3.6	3.4	0.8
Reproductive	0.0	0.0	0.3	0.4	5.5	0.8
Skin/subcutaneous	20.3	10.5	6.6	6.8	6.8	12.3
Musculoskeletal	0.0	0.0	3.0	3.0	0.0	0.0
Eye	0.0	0.0	2.4	4.0	3.6	2.9
Ear	5.8	17.5	7.4	0.4	4.0	10.1
Nose/sinus	2.5	0.8	1.5	1.2	0.9	2.0
Throat	2.7	2.9	2.6	2.3	1.5	2.6
Nutrition	22.6	28.5	19.8	16.0	19.1	22.3
Other**	0.4	0.4	0.4	0.6	1.0	0.5
Overall physical	57.2	63.0	47.5	45.2	44.6	53.7

*Six children with unknown ages are included in this column.
**Includes endocrine and genetic problems.

TABLE 5

PERCENTAGE OF CHILDREN WITH HEALTH CARE NEEDS
IDENTIFIED DURING EPSDT SCREENING VISITS BY PROBLEM TYPE AND AGE GROUP
Michigan, 1989

	Under 1 Year	1-2 Years	3-6 Years	7-12 Years	13-20 Years	All Ages*
No. of children with EPSDT visits	17,808	19,480	30,066	24,149	17,847	109,355
Behavior/mental health	0.5%	1.4%	1.6%	<0.1%	<0.1%	0.8%
Physical growth	1.6	3.5	3.5	<0.1	<0.1	2.7
Chest/lung	7.3	7.2	6.7	6.6	9.2	7.9
Heart/circulatory	0.2	<0.1	0.3	0.7	1.7	0.5
Blood	13.1	14.0	11.9	8.5	11.0	11.6
Abdomen/digestive	0.2	2.1	1.7	1.5	5.8	2.8
Urine	0.2	0.6	1.6	3.7	6.6	2.8
Reproductive	6.1	3.6	2.6	3.5	7.6	4.2
Skin/subcutaneous	11.8	9.3	7.2	7.6	8.4	2.7
Musculoskelodal	10.5	8.6	6.6	7.3	9.5	8.3
Eye	3.2	2.7	16.4	22.9	36.6	16.6
Ear	10.3	17.5	16.8	11.0	10.8	13.6
Nose/sinus	8.1	10.6	6.6	6.5	5.0	7.9
Throat	--	--	--	--	--	--
Nutrition	--	--	--	--	--	--
Other**	29.3	23.8	19.6	17.4	28.0	22.8
Overall physical	58.6	57.4	58.3	57.4	72.4	60.3

*Five children with unknown ages are included in this column.
**Includes nutrition, throat, nervous system, congenital anomalies, environmental, endocrine, genetic and other non-specific problems.

"other" category had the highest frequency among the problem areas (23 percent), we do not know how many of the "other" problems were related to nutrition in Michigan.

With respect to change over time in Georgia (see Tables 3 and 4), the prevalence of all types of health care needs remained fairly stable among the children with EPSDT screening visits. The prevalence of chest/lung problems increased slightly, especially among toddlers (ages 1 - 2 years) and the prevalence of skin/subcutaneous problems increased slightly among infants. In addition, the percentage of children identified as having nutrition problems declined in all age groups, except infants.

2. Comparisons of problem identification rates with national data

To verify the data from the EPSDT screening files, as well as to compare the results for Medicaid children to other children in the United States, we analyzed survey data from the 1991 National Ambulatory Medical Care Survey (NAMCS). This survey yields a visit-based file that includes data on the reason for visit, diagnoses of identified conditions, and source of payment. We used these data to compute the rate at which health care needs were identified for Medicaid and other children under 21 years of age when they visited physicians for preventive care.

Three reason-for-visit variables are included in the file. We designated a visit as preventive care if any one of these three variables had a code for general examinations, special examinations, diagnostic tests, or other screening and preventive procedures, except family planning. Each visit record also contains up to three ICD-9-CM diagnosis codes. We recoded these variables to be consistent with our EPSDT problem categories. Finally, we separated Medicaid recipients from other children according to the source of payment variable.

Table 6 shows problem identification rates from a national sample of preventive care visits made by Medicaid and other children in the United States. There was a much lower rate of reported health care problems among the preventive care visits for Medicaid children in the 1991 NAMCS (20 percent) compared to the EPSDT screening data for Medicaid children in Georgia (54 percent; both years) and Michigan (60 percent). Frequently identified problems common to both sources of data include those related to the ear, the skin, and the chest/lung.

The NAMCS data suggest that private, office-based physicians were less likely to identify health problems during a regular office visit in 1991 than were EPSDT providers in Georgia and Michigan in 1989. EPSDT providers in both States in 1989 were typically physicians and other practitioners working in local

TABLE 6

PROPORTION OF PREVENTIVE CARE OFFICE VISITS WITH IDENTIFIED HEALTH CARE NEEDS BY MEDICAID STATUS AND PROBLEM TYPE
National Ambulatory Medical Care Survey, 1991

Problem Type	Medicaid	Non-Medicaid
Number of visit records	302	883
Weighted number of visits	7,554,501	22,212,349
Behavior/mental health	1.1%	0.9%
Physical growth	0.7	1.8
Chest/lung	2.4	0.3
Heart/circulatory	0.7	1.5
Blood	2.0	1.0
Abdomen/digestive	0.4	1.8
Urine	0.4	1.0
Reproductive	1.6	1.7
Skin/subcutaneous	0.4	3.7
Musculoskeletal	--	2.5
Nutrition	--	0.3
Eye	0.4	3.3
Ear	0.0	3.2
Nose/sinus	0.2	1.7
Throat	0.4	1.2
Nervous system	--	0.5
Congenital anomalies	2.0	1.2
Environment	2.0	1.8
Endocrine/metabolic	0.2	1.7
Genetic	--	0.9
Other non-specific	3.5	3.4
Overall physical	20.3	29.9

public health departments. Issues related to data comparability no doubt explain some of the difference. For example, during a general physical examination, a private physician may provide nutritional counseling for a child at risk for nutrition-related problems but may not record a diagnosis for a dietary problem on the child's chart. In such a case, we would not find a nutritional health care need on the NAMCS visit record. On the other hand, Georgia's provider manual for EPSDT screening visits requests providers to record any nutritional services provided, including WIC referral and dietary counseling. Furthermore, the greater comprehensiveness of EPSDT screening visits might lead to a higher rate of problem identification.

Comparing the NAMCS rates for Medicaid- and non-Medicaid-covered visits, we found that physicians were more likely to identify problems for non-Medicaid recipients than they were for Medicaid recipients (30 versus 20 percent). The top five health care needs identified for Medicaid children were those related to the ear, the skin, chest/lung, congenital anomalies, and the reproductive system. The same types of problems were most frequently identified for non-recipients of Medicaid, with the exception of congenital anomalies, which were not as prevalent. Instead, nose/sinus problems were among the five most commonly identified for this group.

C. Treatment and Referral Services

The on-site provision of a broad range of medical and other health-related services is a desirable characteristic of any primary health care system. It is especially important, though, for delivery systems serving Medicaid recipients and other populations for whom transportation and appointment-related arrangements (e.g., time away from work or day care) are often a burden. Also, there are many competing demands (e.g., recertification for welfare, obtaining food stamps) that may deter Medicaid recipients from seeking follow-up medical care at another time or place. For these reasons, we are interested in the extent to which children with health care needs were treated during the EPSDT screening visits versus the extent to which they were referred to other providers for further diagnosis and treatment.

In Table 7, we show that for the most part, in both study States, treatment of health care needs during the screening visit was more common than referral. Two exceptions stand out: in Michigan, more referrals were made (rather than treatments rendered) for problems related to the blood, and in both States (1989 only), more referrals were made for ear problems. In Georgia, there were slightly more referrals than treatments for heart/circulatory, urine, eye (both years), and throat problems (1989 only), but the differences were very small.

TABLE 7

PERCENTAGE OF EPSDT SCREENING VISITS* WITH HEALTH CARE NEEDS THAT WERE TREATED AND/OR REFERRED BY PROBLEM TYPE: MICHIGAN, 1989 AND GEORGIA, 1989 AND 1992

	Michigan - 1989		Georgia - 1989		Georgia -1992	
Number of EPSDT screening visits	111,762		106,554		233,856	
	With Treatment	With Referral	With Treatment	With Referral	With Treatment	With Referral
Behavior/mental health	0.5%	0.3%	1.0%	0.5%	0.6%	0.3%
Physical growth	1.3	1.3	4.8	1.8	0.3	0.8
Chest/lung	3.5	3.4	1.1	2.1	0.1	0.8
Heart/circulatory	0.2	0.8	1.1	1.9	0.8	0.0
Blood	4.6	6.8	4.5	0.6	3.4	0.2
Abdomen/digestive	2.0	6.8	1.0	0.4	0.8	0.4
Urine	2.0	1.8	1.0	2.0	1.1	4.2
Reproductive	2.3	1.8	0.5	0.4	0.3	0.2
Skin/subcutaneous	5.6	7.6	0.8	0.5	0.8	1.9
Musculoskeletal	4.6	3.4	0.0	0.0	0.0	0.2
Eye	2.0	7.6	0.8	0.3	1.0	1.1
Ear	6.2	7.6	3.1	0.0	4.2	3.4
Nose/sinus	4.6	2.9	0.8	0.6	1.1	0.4
Throat	--	--	0.8	1.8	0.9	0.9
Nutrition	--	--	23.3	0.6	18.8	0.3
Other**	14.8	6.8	0.0	0.3	0.9	0.1
Overall physical	37.3	34.7	42.3	16.6	40.6	10.9
Oral health	47.8	15.3	18.5	33.0	15.7	19.8

*Partial screening visits for eye examinations found in the 1989 and 1992 Georgia files are not included in these figures.
**Includes endocrine and genetic problems in Georgia and nutrition, throat, nervous system, congenital anomalies, environmental, endocrine, genetic and other non-specific problems in Michigan.

In general, during approximately 40 percent of the EPSDT screening visits made in the two study States in both 1989 and 1992, a child was treated for an identified physical problem. In 11 to 17 percent of all visits in Georgia (1989 and 1992) and in one-third of all visits in Michigan (1989), children were referred to another provider for diagnosis and/or treatment of a potential physical problem. In 1989, a child in Georgia was slightly more likely to have a physical problem treated by the EPSDT screening provider compared to a child in Michigan (42 versus 37 percent). Conversely, a child in Michigan was far more likely to have been referred to another provider for further diagnosis and treatment of a physical problem compared to a child in Georgia (35 versus 17 percent).

For 1989, the State difference in referral rates for physical problems is partly due to a higher problem identification rate and a lower treatment rate in Michigan but may also be due to differences in the types of providers rendering screening visits, the integration of EPSDT providers with the rest of the medical community, and the service coverage of the States' Medicaid programs. In Michigan, local public health departments were virtually the only providers of EPSDT services through the late 1980s.[4] These departments may not have had the breadth of services or variety of care givers required to treat all children's health care needs. While the EPSDT program was open to private providers in Georgia, local public health departments also dominated the provision of EPSDT screening services in that State. However, in our site visit to Georgia for this project, we found poor integration between the local health departments and other providers to be a significant problem.[5] This poor integration may have served to lower the rate of referrals. Finally, Michigan covered many more auxiliary health care services, such as physical therapy, occupational therapy, services for speech, hearing and language disorders, and other rehabilitative services not covered under Georgia's Medicaid program in 1989.[6] Therefore, we would expect referrals to providers of these services in Michigan but not in Georgia.

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[4] See *Chapter 3: Michigan* in Ian Hill and Beth Zimmerman, *Evaluation of EPSDT Programs in the Tape-to-Tape States. Volume II: Case Study Reports.* Final report submitted to the Office of Research and Demonstrations, Health Care Financing Administration, Baltimore, MD, January 6, 1995.

[5] See *Chapter 2: Georgia* in Ian Hill and Beth Zimmerman, *Evaluation of EPSDT Programs in the Tape-to-Tape States. Volume II: Case Study Reports.* Final report submitted to the Office of Research and Demonstrations, Health Care Financing Administration, Baltimore, MD, January 6, 1995.

[6] The 1989 Omnibus Budget Reconciliation Act requires States to cover any services available for federal matching that is needed to correct health problems discovered during EPSDT screening visits, regardless of whether the services are covered under the State's Medicaid plan. However, this law was not in effect during 1989.

We find the reverse pattern between the two study States for dental care in 1989. Michigan children were more likely to receive dental treatment from an EPSDT provider (48 versus 19 percent) while children from Georgia were more likely to be referred to another provider (33 versus 16 percent).

With respect to changes over time in Georgia, slightly fewer problems were treated during EPSDT screening visits, with the largest decreases found for nutrition counseling and oral health. These decreases were partially offset by increases in the incidence of treatment for skin/subcutaneous, chest/lung, and ear problems. A somewhat larger decrease in the number of visits with referrals was evident from 1989 to 1992. Referrals were made for physical health problems during 17 percent of visits in 1989 and 11 percent of visits in 1992. Similarly, referrals were made for oral health care during 33 percent of the visits in 1989, decreasing to 20 percent of visits in 1992. These trends are consistent with more frequent visits per child -- i.e., after an initial referral for a particular problem, the child may have been treated or under care by subsequent visits and therefore would not need another referral.

The differences in the treatment and referral rates between the two study States in 1989 could also have been due to differing demographic compositions of the two Medicaid child populations. To investigate this, we broke out the percentages of EPSDT screening visits with treatment, referral, and both treatment and referral by age group, gender and race. These data are shown for Georgia and Michigan in Appendix Tables 8 and 10, respectively. Across all age groups, genders, and races, physical health care needs were more likely to be treated than referred in Georgia while, with the exception of infants, oral health care needs were more likely to be referred than treated. In Michigan, unlike Georgia, there was almost an equal number of visits with referrals alone as there was with treatments alone for physical health care needs and half again as many visits with both treatments and referrals. This was true across disaggregations by most age, gender and race categories.

The data in Tables 8, 9 and 10 allow us to determine whether any particular group of children were systematically treated during an EPSDT screening visit and/or referred to other providers more often than other groups of children. In both States, referrals for physical health care needs were made more often among older children compared to infants and toddlers. Adolescents in Michigan were more likely to be both treated and referred for physical health care problems compared to younger children. Very few infants and toddlers were either treated or referred for dental care. Finally, whites were slightly more likely to receive treatment for physical problems compared to other races in both States. In Michigan, African Americans were more likely than other races to receive dental care.

TABLE 8

PERCENTAGE OF EPSDT SCREENING VISITS* WITH HEALTH CARE NEEDS THAT WERE TREATED AND/OR REFERRED BY AGE GROUP, GENDER AND RACE
Georgia, 1989

	Physical Health Care Needs			Oral Health Care Needs		
	With Treatment Alone	With Referral Alone	With Treatment and Referral	With Treatment Alone	With Referral Alone	With Treatment and Referral
All screening visits	35.8%	10.1%	6.5%	18.4%	32.9%	0.1%
Age Group						
Under 1 year	37.7	6.7	3.9	0.7	0.3	0.0
1-2 years	41.4	9.9	7.5	2.8	7.2	0.0
3-6 years	33.0	11.8	7.3	33.9	65.8	0.2
7-12 years	31.6	12.6	7.8	38.6	61.3	0.2
13-20 years	31.4	12.4	7.5	35.9	63.9	0.2
Gender						
Male	34.4	10.3	6.4	17.3	30.6	0.1
Female	34.7	9.5	6.0	18.3	33.0	0.1
Race						
White	37.2	10.2	7.4	20.5	32.9	0.1
African American	33.9	9.8	5.9	17.7	32.9	0.1
Other	25.8	9.8	5.1	17.9	33.7	0.0
Unknown	34.6	13.2	10.7	29.8	51.1	0.0

*Partial screening visits for eye examinations in Georgia are not included in these figures.

TABLE 9

PERCENTAGE OF EPSDT SCREENING VISITS WITH HEALTH CARE NEEDS
THAT WERE TREATED AND/OR REFERRED BY AGE GROUP, GENDER AND RACE
Georgia, 1992

	Physical Health Care Needs			Oral Health Care Needs		
	With Treatment Alone	With Referral Alone	With Treatment and Referral	With Treatment Alone	With Referral Alone	With Treatment and Referral
All screening visits	36.6%	6.9%	4.0%	15.6%	19.7%	0.1%
Age Group						
Under 1 year	38.0	4.5	2.8	0.8	0.1	0.0
1-2 years	42.6	7.0	5.3	3.9	5.0	0.0
3-6 years	31.9	9.6	4.6	43.4	56.2	0.3
7-12 years	29.2	10.9	4.5	46.0	53.8	0.2
13-20 years	29.0	10.1	4.9	40.5	59.3	0.2
Gender						
Male	36.7	7.3	4.3	15.3	18.8	0.1
Female	36.5	6.5	3.6	15.8	20.5	0.1
Race						
White	38.1	6.1	4.4	15.2	15.9	0.0
African American	35.7	7.3	3.7	16.0	22.0	0.1
Other	36.0	8.1	4.4	8.4	12.5	0.0
Unknown	52.4	4.2	7.0	19.4	20.3	0.0

TABLE 10

PERCENTAGE OF EPSDT SCREENING VISITS WITH HEALTH CARE NEEDS
THAT WERE TREATED AND/OR REFERRED BY AGE GROUP, GENDER AND RACE
Michigan, 1989

	Physical Health Care Needs			Oral Health Care Needs		
	With Treatment	With Referral	With Treatment and Referral	With Treatment	With Referral	With Treatment and Referral
All screening visits	25.2%	22.6%	12.1%	47.8%	15.3%	0.0%
Age Group						
Under 1 year	27.2	21.2	9.4	1.4	0.1	0.0
1-2 years	24.9	21.8	9.8	7.1	1.8	0.0
3-6 years	21.4	24.8	12.0	69.4	24.4	0.0
7-12 years	24.4	21.8	11.2	74.1	22.1	0.0
13-20 years	30.5	22.6	19.3	72.7	22.4	0.0
Gender						
Male	25.0	22.4	11.8	46.4	15.0	0.0
Female	25.3	22.8	12.5	49.2	15.6	0.0
Race						
White	26.2	22.0	12.4	44.1	15.1	0.0
African American	24.1	23.2	11.8	53.3	14.5	0.0
Other	22.4	24.1	11.6	48.8	20.1	0.0
Unknown	26.4	23.1	15.9	45.0	23.4	0.0

In terms of change over time, the trends across age, gender and race among Georgia Medicaid children were consistent with a few exceptions (see Tables 8 and 9). The lower overall frequency of oral health treatment was due to the differing age distributions of children in 1989 versus 1992. Children aged three years and above actually were more likely to receive dental care during an EPSDT screening visit in 1992 than they were in 1989. However, referrals for dental care declined slightly among all age categories.

IV. UP-TO-DATE STATUS FOR IMMUNIZATIONS AMONG EPSDT PARTICIPANTS

To assess the delivery of immunizations to Medicaid children, we performed analyses on data from the Supplemental EPSDT Health Screening Files which contain information on EPSDT participants' up-to-date status for all immunizations. As with the data reported above, the immunization status measures were limited in their completeness, quality and comparability across study States and analysis years. For these reasons, we describe results for California for 1989 and 1992, as well as for Michigan and Tennesse for 1989 only.

A. Summary of Findings on Immunization Status

In general, these analysis indicate that immunizations are being effectively delivered to EPSDT participants:

- In both analysis years, a large proportion of EPSDT participants (i.e., a minimum of about two-thirds for any subgroup defined by age, gender and race) were on schedule with recommended immunizations at their last EPSDT visit.
- By 1992 in California, with the exception of adolescents, all subgroups defined by age, gender and race showed improvements in the percentage of children who were up-to-date on their receipt of immunizations.
- No gender differences (male versus female) in immunization status were observed.
- Patterns of variation in immunization status by race were unique to each study State.
- With respect to variations by age group, across study States and analysis years, the age group comprised of 7 to 12 year olds had the highest percentage of children who were current in their immunizations at their last EPSDT visit, while the lowest percentages were observed for toddlers (Michigan and Tennessee, 1989) and infants (California, 1989 and 1992).
- Comparisons of data on immunization status and age-appropriate, AAP-adjusted immunization compliance rates indicated that Medicaid-enrolled infants probably obtained some immunizations outside the Medicaid program in each study State and analysis year examined. Vaccine-specific analyses were also consistent with these overall findings. (The

data did not permit similar comparisons for other age groups.) In general, these findings suggest that Medicaid claims data are likely to underestimate the provision of all immunizations to Medicaid-enrolled children. The extent of this phenomenon cannot be accurately measured based on the data available for this study.

B. Detailed Immunization Findings by Subgroup

Table 11 shows the percentage of children who were up-to-date in common childhood immunizations during their last EPSDT screening visit by age group, gender and race. Overall, these data indicate that a large proportion of EPSDT participants were on schedule with recommended immunizations during the two analysis years. Indeed, a minimum of about two-thirds of all subgroups had been identified by EPSDT providers as up-to-date in their receipt of immunizations in both 1989 and 1992. By 1992 in California, with the exception of adolescents, all other subgroups had shown improvements in these percentages over time.

With respect to gender, there were virtually no differences in immunization status between males and females across study States and analysis years.

Patterns of variation in immunization status by race were unique to each study State. In Tennessee for 1989, whites had the highest percentage of children who were current in their immunizations as of their last EPSDT visit at 84 percent, while the "other" race category had the lowest percentage at 75 percent. In Michigan for 1989, 84 percent of African American children were up-to-date on their immunizations compared to 74 percent of children with unknown race. In California for both 1989 and 1992, the "other" and unknown race categories had the highest percentage of children current in their immunizations, ranging from 69 to 74 percent, versus African American children with the lowest percentages at 65 to 69 percent.

With respect to variations by age group, across study States and analysis years, the highest percentage of children who were current in their immunizations as of their last EPSDT visit was found for the 7 to 12 year old age group (75 to 90 percent). This is most likely due to the requirement that children be up-to-date on immunizations for school entry. For 1989 in both Michigan and Tennessee, the age group with the lowest percentage of children who were up-to-date on their immunizations was toddlers ages 1 - 2 years (76 to 78 percent). For California in 1989 and 1992, the lowest percentage was found among infants (61 to 65 percent).

TABLE 11

PERCENTAGE OF CHILDREN UP-TO-DATE IN CHILDHOOD IMMUNIZATIONS
DURING THEIR LAST EPSDT SCREENING VISIT BY AGE GROUP, GENDER AND RACE

	Tennessee 1989		Michigan 1989		California* 1989			California* 1992		
	Not Up to Date	Up to Date	Not Up to Date	Up to Date	Not Up to Date	Up to Date	Un-known	Not Up to Date	Up to Date	Un-known
All children with visits	18.7%	81.2%	16.4%	83.0%	9.2%	69.6%	21.2%	6.1%	72.9%	21.0%
Age Group										
Under 1 year	17.4	82.5	19.5	80.5	9.4	61.5	29.1	5.7	64.8	29.6
1-2 years	21.5	78.4	24.3	75.7	11.5	73.4	15.1	7.3	81.3	11.4
3-6 years	19.4	80.5	14.4	85.5	10.0	72.1	18.0	7.5	74.8	17.7
7-12 years	13.7	86.3	9.9	89.8	3.8	77.2	19.0	3.1	74.5	22.4
13-20 years	16.3	83.6	16.6	79.9	3.4	74.8	21.9	2.7	70.4	26.9
Gender										
Male	18.8	81.1	16.0	83.7	9.6	68.1	22.4	6.2	73.1	20.7
Female	18.6	81.4	16.8	82.3	9.3	68.0	22.7	6.1	72.7	21.2
Race										
White	15.7	84.3	16.6	82.7	9.6	67.0	23.5	7.1	70.7	22.2
African American	22.4	77.5	15.6	83.5	12.0	65.5	22.5	9.0	69.0	22.0
Other	25.3	74.7	18.1	81.2	8.7	69.3	22.0	5.3	74.2	20.4
Unknown	18.2	81.8	25.0	73.8	7.7	69.2	23.1	4.9	74.1	21.0

*Restricted to children with federally matched EPSDT screening visits.

The analyses of completion rates for common childhood immunizations reported under separate cover (see Footnote 1 for the reference to this analysis) rely on data that reflect only those services billed and paid through the Medicaid program. Medicaid claims do not capture immunizations children may have received when they were not enrolled in Medicaid or immunizations received during periods of Medicaid enrollment that were paid through other funding mechanisms.

To estimate the extent to which Medicaid-enrolled children in the study States received immunizations outside of Medicaid, for infants only, we can compare the age-appropriate, AAP-adjusted immunization completion rates (displayed in Table E-2 of the report referenced in Footnote 1) with the immunization status figures presented in Table 11. This comparison is necessarily restricted to infants, since this is the only age group for which both sets of measures apply to the same time frame, that is, from birth up to 12 months of age.

These comparisons suggest that Medicaid-enrolled infants probably obtained some immunizations that were not financed by Medicaid. This phenomenon was most prevalent in Tennessee (1989), followed by Michigan (1989), and then California (1989 followed by 1992). For example, in Tennessee for 1989, according to the analysis of Medicaid claims data (see Footnote 1), 47 percent of all recommended, age-appropriate immunizations were received by infants. Yet the analysis of EPSDT screening records indicated that 83 percent of infants who participated in EPSDT were judged by EPSDT providers to be up-to-date in their immunization status as of their last EPSDT visit. Assuming the EPSDT screening records were complete, accurate and representative of all Tennessee infants (EPSDT participants and non-participants alike), if Medicaid had covered all immunizations received by these children, we would expect their corresponding immunization completion rate based on Medicaid claims to be close to 80 percent, but instead, it was under 50 percent. Similar figures for the remaining study States and years reveal the same pattern of findings: (1) for Michigan (1989)--37 percent of immunizations received compared to 81 percent of infants up-to-date, and (2) for California (1989 and 1992, respectively)--44 and 48 percent of immunizations received compared to 62 and 65 percent of infants up-to-date.

Tables 12 and 13 show data on vaccine-specific immunization status by age group for Michigan, 1989, and California, 1989 and 1992, respectively. For infants only, when compared with corresponding completion rates (see Table E-4 in the report referenced in Footnote 1), the data specific to DTP and OPV vaccinations confirm the results reported above for all recommended immunizations as a whole.

TABLE 12

PERCENTAGE OF CHILDREN UP-TO-DATE IN CHILDHOOD IMMUNIZATIONS DURING THEIR LAST EPSDT SCREENING VISIT BY IMMUNIZATION TYPE AND AGE GROUP Michigan 1989

	Under 1 Year	1-2 Years	3-6 Years	7-12 Years	13-20 Years	All Ages*
No. of children with EPSDT visits	17,808	19,480	30,066	24,149	17,847	109,355
Oral polio vaccine	82.2%	80.0%	86.9%	90.4%	84.0%	85.2%
Diphtheria-tetanus-pertussis	80.9	79.0	86.3	90.1	80.5	84.0
Measles	--	83.9	92.7	92.3	84.6	90.9
Mumps	--	83.9	92.7	92.3	84.6	90.9
Rubella	--	83.8	92.7	92.3	84.4	90.9

*Five children with unknown ages are included in this column.

TABLE 13

PERCENTAGE OF CHILDREN* UP-TO-DATE IN CHILDHOOD IMMUNIZATIONS DURING THEIR LAST EPSDT SCREENING VISIT BY IMMUNIZATION TYPE AND AGE GROUP
California 1989 and 1992

	Under 1 Year	1-2 Years	3-6 Years	7-12 Years	13-20 Years	All Ages
1989						
No. of children with EPSDT screening visits	174,522	138,149	130,759	51,599	29,649	524,678
Oral polio vaccine	63.1%	83.3%	83.7%	81.8%	79.5%	76.3%
Diphtheria-tetanus-pertussis	62.1	82.1	82.9	82.1	81.2	75.6
Measles	--	91.4	85.6	81.8	80.0	91.2
Mumps	--	91.4	85.6	81.8	79.5	91.2
Rubella	--	85.8	78.7	79.0	77.3	87.6
Haemophilus influenza type b	6.8	43.5	52.8	33.5	25.1	31.6
1992						
Number of children with EPSDT screening visits	330,613	252,161	204,104	85,761	53,308	925,947
Oral polio vaccine	66.2%	88.2%	85.2%	79.9%	75.7%	78.2%
Diphtheria-tetanus-pertussis	65.6	87.4	84.6	80.2	78.7	77.8
Measles	--	92.5	88.1	82.4	78.7	92.5
Mumps	--	92.5	88.1	82.4	78.6	92.5
Rubella	--	89.6	83.5	80.5	77.1	90.4
Haemophilus influenza type b	65.7	86.5	74.2	56.0	39.7	70.8

*Restricted to children with federally matched EPSDT visits.

In general, these findings suggest that Medicaid claims data are likely to underestimate the provision of all immunizations to Medicaid-enrolled children. The extent of this phenomenon cannot be accurately measured based on the data available for this study.

V. CONCLUSIONS

Based on data from Georgia and Michigan, our study indicates that EPSDT is generally attaining its intended goal: EPSDT providers identify health care needs for more than one-half of the children screened, treat the majority of these problems during screening visits, and refer children to other providers for further diagnosis and treatment when necessary. However, the problem identification rates observed in this study appear very high when compared to the general population. We found problem identification was far less in the NAMCS data for both Medicaid and non-Medicaid children who had preventive care office visits. This discrepancy is likely due in part to different recording practices by physicians. NAMCS data also show that physicians were less likely to identify health problems for their Medicaid patients than they were for their non-Medicaid patients.

In general, the problems identified during EPSDT screens were more likely to be treated than referred. Referral rates differed substantially across States. The rate at which EPSDT providers should be providing diagnosis and treatment services versus the extent to which they should refer children to other providers to achieve appropriate levels of participation in the health care system and efficient use of resources is unknown. A recent article[7] cited the need among the general population for referral to secondary care for short-term consultation or to tertiary care specialists for unusual problems as in the range of 15 to 25 percent. Whether this rate should be higher or lower for a low-income child population receiving regular screening and preventive care services is not clear.

In general, the majority of children who participated in EPSDT were on schedule with recommended immunizations at their last EPSDT visit. With respect to variations by age group, children ages 7 to 12 years had the highest percentage who were current in their immunization status while infants and toddlers had the lowest such rates. Finally, from a methodological standpoint, when compared to EPSDT screening data, we found that Medicaid claims may underestimate immunization completion rates. That is, our data suggest that Medicaid-enrolled children receive some immunizations paid outside the Medicaid program, but the extent of this phenomenon cannot be accurately estimated with the data available for this study.

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[7]Barbara Starfield, Is primary care essential? *The Lancet* 344 (October 22, 1994):1129-1133.